desirable, is it possible to do so? The general trend of opinion at the present time is that, except for certain isolated trades, a revival of the apprenticeship system is both undesirable and impossible. Apprenticeship gives manual dexterity, but not the general industrial knowledge and intelligence which will enable the boy to adapt himself to changing industrial conditions. Hence it is desirable to make the necessary provision for compulsory education in the principles of different trades. The chief suggestions for effecting this are as follows:—(*a*) that the "leaving age" should be raised to fifteen years, the later years of school life being given partly to continuing the general education of the boy or girl, and partly to manual, scientific, and industrial work; (*b*) the establishment of "trade schools" for boys of from thirteen to sixteen years, giving about fifteen hours per week to class-room work in science and English, and about fifteen hours per week in the workshops; (*c*) compulsory attendance, for about twelve or more hours per week, at day or evening continuation schools for all young persons engaged in industrial work.

The movement for the spread of industrial education among the mass of the population of this country merits the support of the scientific world because of its bearing upon the general intellectual development of the nation as a whole, if that industrial education be framed upon sufficiently broad and generous lines. National progress, whether industrial or scientific, depends upon two main agencies—the organiser or leader and the skilled subordinate. University and higher technical education will produce the first of these, but the second will only be forthcoming in sufficient quantities through the operation of a broad general scheme of industrial education.

J. WILSON.

NILOMETRY.[1]

IT is the common fate of the ancient gods of flood and field in these sternly practical days to find their empires gone, their sceptres dishonoured, and even their personal liberty endangered. The Nile is no exception to the rule. The old age of the river of Egypt finds his fitful temper curbed, his moods controlled,

> "... all his faults observed,
> Set in a note-book, learned and conned by rote."

Where he was master, he has become a slave. Where he ruled, he must now learn to obey.

Such are the reflections induced on turning over the pages of a report, recently issued by the Egyptian Survey Department, dealing with the measurement of the water discharged by the Nile. The patient, persistent efforts of a Governmental bureau are gradually transforming the excesses of a capricious river into quiet and orderly processes adapted in every way to the agricultural needs of the country through which it flows. The construction of the Aswan Dam constituted the first great epoch-making achievement in this direction, and it is being followed up by a series of systematic observations of the regimen of the river which will throw light upon many obscurities in its phenomena, and enable further steps to be taken for its improvement.

The Nile, as is now generally known, is fed almost exclusively by the rain which falls over two elevated areas, the equatorial plateau of Central Africa and the Abyssinian plateau. These two sources act in very different ways, the first affording a relatively small but continuous supply, and the latter, copious but intermittent increments, producing the regular flood effect upon which, until quite recently, the agricultural prosperity of the country depended.

The admeasurement of the variation in the volume of water which is thus discharged necessitated the establishment of a gauging station, and the report states that, on grounds of expediency, a site was chosen at Sarras Old Fort, a little above Wadi Halfa. Here the necessary plant and apparatus were installed. It would take too long, however, to recapitulate, even succinctly, the dispositions which were made and the manner in which various local obstacles were overcome. These were duly related in the report, and the results of the observations taken are tabulated in part ii. of the volume. They include the mean velocity and cross-sectional area of the stream on successive dates, also a chemical analysis of the water and the percentage of mud in suspension. A third section gives a brief mathematical account of various rating formulæ for current meters.

NOTES.

WE regret to see the announcement of the death, on December 5, of Prof. H. Bauerman, at seventy-five years of age. The funeral will take place at Brookwood Cemetery on Friday, ember 10.

PROF. A. C. SEWARD, F.R.S., professor of botany in the University of Cambridge, has accepted the invitation of the executive committee of the Yorkshire Naturalists' Union to be president of that society for the year 1910.

THE council of the University of Paris has, we learn from the *Revue scientifique*, passed a resolution to the effect that monuments intended to commemorate men who have brought distinction on the University of Paris since 1808 shall be erected in the church of the Sorbonne. This honour will be awarded on the decision of the council, by a majority of two-thirds, not earlier than ten years after the decease of the person concerned.

WE notice with regret the death of Dr. Jean Binot, on November 25, at the age of forty-two years. Dr. Binot had charge of one of the laboratories of the Pasteur Institute of Paris. Before taking up the study of bacteriology he was associated with astronomy. In 1901 he had charge of an expedition for the study of the transit of Venus, and in connection with this work he was awarded the Janssen prize of the Paris Academy.

AN appeal is being made to the Treasury for funds to complete the publication of the scientific reports of the voyage of the *Scotia*. It appears that the Scottish expedition is the only one of the recent Antarctic expeditions—British, Belgian, German, French, Swedish, and Argentine—that has not received Government help. The appeal is made by the committee of the Scottish National Antarctic Expedition through its honorary secretary, Mr. J. G. Ferrier. An additional grant is asked for beyond the funds for publication, to enable Dr. Bruce to reimburse those who have advanced money beyond their regular subscriptions to the expedition.

THE following are among the lecture arrangements at the Royal Institution before Easter:—Mr. W. Duddell, a Christmas course of six illustrated lectures on modern electricity, adapted to a juvenile auditory: (1) first principles; (2) electrical instruments; (3) Röntgen rays; (4) the generation of electricity; (5) electric oscillations; (6) electric lighting; Prof. W. A. Herdman, three lectures on the cultivation of the sea; Rev. C. H. W. Johns, two lectures on Assyriology; Prof. F. W. Mott, six lectures on the emotions and their expression; Prof. Silvanus P. Thompson, three lectures on illumination, natural and artificial; Sir J. J. Thomson, six lectures on electric waves and the electromagnetic theory of light. The Friday evening meetings will commence on January 21, when Sir James Dewar will deliver a discourse on light reactions at low temperatures. Succeeding discourses will probably be given by the Rev. Canon Beeching, Prof. W. Bateson, Mr. C. E. S. Phillips, Prof. H. H. Turner, Lord Rayleigh, Dr. C. Chree, Dr. H. Brereton Baker, Sir J. J. Thomson, and other gentlemen.

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[1] "Measurement of the Volumes Discharged by the Nile during 1905 and 1906." By E. M. Dowson, with a Note on Rating Formulæ for Current-meters, by J. I. Craig. Egyptian Ministry of Finance. Survey Department Paper, No. 11. Pp. 82. (Cairo: National Printing Department.) Price 100 millièmes.

THE death is announced of Dr. T. Nishikawa, of Tokyo, for a number of years an associate of Dr. Kishinouyé in the Imperial Fisheries Bureau in Tokyo, and later a special investigator of pearls. Writing in *Science*, Prof. Bashford Dean says that Dr. Nishikawa was distinguished as the discoverer of a process by which the pearl oyster may be caused to secrete spherical pearls. Before this only hemispherical pearls had been produced, in spite of centuries of experimentation, especially in the Orient. Dr. Nishikawa devoted nearly ten years to his studies on producing pearls, and achieved success only in the days of his final illness. In his memory, and in token of the importance of his discovery, a number of his living pearl oysters were taken to the University of Tokyo on the occasion of the late graduation ceremony; they were opened in the presence of the Emperor, and Prof. Iijima demonstrated that their mantles had secreted spherical pearls. The publications of Dr. Nishikawa include important contributions to our knowledge of Japanese fishes, structural, systematic, and embryological. Especially to be recalled is his pioneer paper on the development of the remarkable frilled shark, *Chlamydoselachus anguineus*.

THE Dick Institute, Kilmarnock, a gift to his native town from the late James Dick, of the Greenhead Gutta-percha Works, Glasgow, was destroyed by fire on the evening of November 26. The building, which cost about 15,000*l*., consisted of a public library and museum. The latter contained the very valuable collection of Carboniferous fossils which belonged to the late James Thomson, of Glasgow; a splendid collection of silurians, antiquities, &c., presented by the late Dr. Hunter-Selkirk, of Braidwood, Lanarkshire; and a very handsome collection of native birds presented by the Kilmarnock Glenfield Ramblers' Society, together with numerous other articles of great scientific value. Mr. H. Y. Simpson, librarian of the institute, informs us that the whole of these have been destroyed by the fire, and the loss is looked upon as irreparable, particularly so in the case of the Thomson collection of corals and reptiles, many of which were type-specimens, and therefore regarded by geologists as quite of incalculable value.

THE annual general meeting of the Royal Agricultural Society of England was held on December 8, when various reports, including that of the council, were considered. The council's report shows that the total number of governors and members on the register is 9920. The show of 1910 will take place in Liverpool on the Wavertree Playground from June 21–25. We notice that prizes to the value of 450*l*. are offered for the best managed farms in four classes, duly specified in the report, the competition being confined to tenant farmers resident in Lancashire and Cheshire. The society is also offering a gold medal for the best agricultural motor. A pleasing increase in the number of samples analysed in the society's laboratory is recorded, the number for the last twelve months being 475, as against 410 in 1908. The work at the Woburn Experimental Farm and Pot-culture Station has progressed well. The field experiments have included an extensive series on the relative value of the new nitrogenous manures, calcium cyanamide and calcium nitrate, in comparison with ammonium sulphate and sodium nitrate; also a further trial has been given to "nitro-bacterine" and other methods for inoculating leguminous and other crops, and the experiments with magnesia on different field crops have been carried a stage further. Satisfactory work is reported also in the botanical and zoological departments.

AN article upon "The Danger of the Comet," contributed to the December number of *Pearson's Magazine* by Mr. E. C. Andrews, contains some interesting particulars—popularly expressed—relating to Halley's and other comets, and an imaginative description of the consequences of a collision between the earth and a comet. As nothing is definitely known about the size of the meteorites which probably form a comet's head, the result of the earth passing through the head is problematical. If the head is merely a condensed swarm of cosmic dust particles, there would be a fine shower of shooting-stars, but if the meteorites in it weigh tons instead of grains or ounces, the consequences of a collision with it would, of course, be serious. The tail of a comet is, however, so extremely attenuated in its nature that even if it consists of poisonous gases our atmosphere is not likely to be appreciably affected by it. To describe the tail, as Mr. Andrews does, as a "dense stream of fiery fragments" is, to say the least, misleading. No comet has a mass which is as much as the hundred-thousandth part of the earth's mass; in other words, the total mass of any comet is less than that of a ball of iron 150 miles in diameter. The fall of a comet into the sun would, therefore, not produce more heat than the sun radiates in eight or nine hours. As Prof. C. A. Young remarked, when referring to the possibility of this event, "there might, and very likely would, be a flash of some kind at the solar surface as the shower of cometary particles struck it, but probably nothing that the astronomers would not take delight in watching." It is desirable to remember facts like these when speculating upon the subject of danger from comets.

THE report of the committee of the Warrington Museum for the year ending at Midsummer last records the additions to the collection during the year. The curator ought to be aware that *Vespertilio auritus* is not the proper designation for the long-eared bat.

IN a paper published in the *Boletin de la Instrucción Pública*, Buenos Aires, Mr. R. Sinet gives an illustrated summary of Dr. Ameghino's views with regard to the pedigree of the human species, especially dwelling on the supposed evidence of the evolution having taken place from marsupial-like ancestors in South America itself.

IN vol. xl., part i., of the *Comptes rendus de la Société Impériale des Naturalistes de St. Pétersbourg*, Mr. G. Nilus describes two polyzoans, *Loxosoma murmanica* and *L. brumpti*, collected in Kola Fjord, on the Murman coast, where they occurred in great profusion, accompanied by other polyzoans and the gephyrean *Phasiolion spitzbergense*.

THE first two articles in the January-June issue of the *Sitzungsberichte und Abhandlungen* of the Dresden Institute are devoted to subjects connected with Darwinism and Darwin, Dr. E. Kalkowsky dealing in the former with the geological foundation of the doctrine of evolution, while in the latter Prof. O. Drude discourses on the theory of the origin of species, and especially the publication of the famous volume bearing that title, as a land-mark in the life of Darwin.

ACCORDING to a paper by Mr. L. B. Taylor, published in the October number of the Journal of the South African Ornithologists' Union, Verreaux's eagle (*Aquila verreauxi*) constructs its nest in Cape Colony entirely of the green boughs of a rough bush, which must be very difficult to break off. The only other instance of the use of similar material for nest-making occurs in the case of the African *A. wahlbergi*, where it is used as lining. *A. verreauxi* preys, to a great extent, on hyraxes, numerous remains of which were found in the nest examined by Mr. Taylor, but also hunts and kills a certain number of klipspringers.

THE latest issue (vol. vi., anno 3) of *Rivista di Scienza* contains three articles on geological subjects, Prof. L. de Marchi dealing with mountain-formation, Prof. F. E. Mess contributing the second instalment of an interesting article on modern theories of volcanic action, and Messrs. P. Enriques and M. Gortani discussing the succession of geological periods. The last-named article is of a somewhat remarkable character, as the authors deny the existence of any such definite periods. They do not, however, propose to abolish the generally accepted geological classification, which they consider necessary for the convenience of study, but content themselves with pointing out its purely artificial character.

THE important subject of the working of teak forests comes in for discussion in the *Indian Forester* (October). Mr. J. F. Troup, the imperial superintendent of forest working-plans, recommends measures for improvement fellings in the Burma forests associated with burning of undergrowth to help natural reproduction and produce even-aged crops. With reference to the mixed teak forests in the Central Provinces, where the system is coppice with standard, Mr. C. M. McCrie points out that information is wanting as to the longevity of coppiced stools and coppice shoots, also as to the fertility of seed produced by the latter.

FOR many years coffee plantations in Central America have suffered from the attacks of a parasitic fungus which is said to be almost as dangerous as its better known eastern congener, *Hemileia vastatrix*. Little information has been available concerning the life-history of the fungus except the production of a conidial stage on diseased leaves, shoots, and fruits, to which Cooke gave the name *Stilbum flavidum*. Mr. G. Massee now records in the *Kew Bulletin* (No. 8) that he has obtained an ascus-forming (Nectria) stage, which transfers the fungus to the genus Sphærostilbe. Unlike the conidia, the ascospores readily produce infection in healthy leaves, leading to the formation of the customary white spots and conidiophores.

A STUDY of the phytoplankton gathered in the North Atlantic Ocean affords a great deal of variation, as will be realised from the results published by Mr. W. Stüwe in Engler's *Botanische Jahrbücher* (vol. xliii., part iv.). From Dover to Brest the plankton is coastal, and consists almost entirely of diatoms, with a preponderance of species of Coscinodiscus and Biddulphia. Thence to the Azores species of Ceratium abound in the deeper waters, but in the neighbourhood of the Canaries the increase of Bacillariaceæ betokens an influx of coastal forms. Around the Cape Verde Islands Trichodesmium is dominant in the equatorial currents. Another type of vegetation is met with in the Sargasso Sea, in which species of Ceratium, notably *Ceratium tripos protuberans*, are common. With regard to vertical distribution, in the colder waters the Bacillariaceæ predominate at the surface, while the Peridineæ occur in the next zone; in the warm seas the Peridineæ lie at the surface, and the diatoms are found below.

THE results of manurial experiments on the sugar-cane, carried out at the Experiment Station of the Hawaiian Sugar-planters' Association, have just been issued (Bulletin No. 29). The results could not be correlated with the chemical composition of the soil as determined by the ordinary methods of analysis or by the aspartic acid method first used in Hawaii, and the author concludes that the profit resulting from the application of manures will depend largely upon other factors than the chemical composition of the soil. The greatest loss from the use of improper mixtures of fertilisers was found to occur in acid soils.

WE learn from the *Journal of Agriculture of South Australia* that the Irish potato blight (caused by the fungus *Phytophthora infestans*) has made its appearance in several of the Australian States. It does not appear that the disease is yet very widespread, and by mapping out the affected areas and adopting suitable precautions within those areas it should be possible to prevent great damage being done. A well-illustrated account of the disease is given, so that the practical man may readily recognise it, and methods of treatment are fully described. Spraying with Bordeaux mixture is a well-recognised preventive measure, and is discussed at some length.

A SUMMARY has recently been issued from the New Jersey Agricultural Experiment Station of the investigations carried out by Messrs. Voorhees and Lipman on various nitrogenous manures. Out of a hundred parts of nitrogen supplied as nitrate of soda, sixty-two parts were recovered in the crop over a period of ten years, and in the case of ammonium sulphate forty-three parts were recovered; these results agree almost exactly with those obtained by Wagner at Darmstadt. The relative availability of the various fertilisers tested was:—

Sodium nitrate	100
Ammonium sulphate	69·7
Dried blood	64·4
Solid manure (fresh)	35·9
Solid and liquid manure (fresh)	53·0
Solid and liquid manure (leached)	43·1
Solid manure (leached)	38·9

THE fundamental importance of irrigation and of methods of dry-farming in South Africa is well brought out in a series of articles in recent issues of the *Agricultural Journal of the Cape of Good Hope*. Throughout considerable areas of South Africa the rainfall is either insufficient or is too irregularly distributed for the best crop returns to be obtained, and the chief problem in arable farming becomes the provision of proper water supply. Recourse may be had either to irrigation or to "dry farming," the former being more generally applicable than the latter. A delegate was sent to the National Irrigation Congress at Albuquerqu, New Mexico, U.S.A., and his report contains many suggestions likely to be of value in evolving methods suited to South Africa. There is also a report on the possibilities of irrigation in Bechuanaland. By way of encouraging dry farming, the De Beers Company is offering at the next Bloemfontein show a prize of 20*l.* for the best exhibit of maize grown on "dry lands" without irrigation.

IN *Man* for November Mr. W. G. Aston raises the question of the origin of sexual antipathy among near relations.

Contesting the views of Messrs. Ellis and Crawley, he regards it as mainly based on a recognition by even savage tribes of the physical dangers of interbreeding. He lays stress on the dogma of Dr. Tylor that "exogamy was an early method of political self-preservation" in widening the influence of the clan by foreign alliances. Nothing is more fatal to a clan than consanguineous marriage, "and few things are more vital to the welfare of a family, a tribe, or a nation than the right ordering of the sexual relations."

IN the September number of *Spolia Zeylanica*, issued by the Colombo Museum, Ceylon, Mr. P. Arunachalam describes the ancient bronzes in the collection, and Mr. D. Wickremasimghe contributes notes on the inscriptions attached to them. The antiquity of the specimens is not very great. King Sigiri Kasypa rendered, we are told, "a lasting service to the chronological history of Ceylon by murdering his father in the fifth century A.D.; but for this signal act of parricide Ceylon dates would be in a greater state of confusion than they are," the date of this event separating the Mahawansa from the so-called Sulawansa period, which terminated in 1815 A.D. All the ancient bronzes in Ceylon belong to the period corresponding to the Middle Ages of Europe. The catalogue is well illustrated with photographs of the more notable specimens, and is of interest as facilitating the comparison of Sinhalese with Hindu art.

THE monthly review of cartography in *Petermann's Mitteilungen* (p. 281) contains articles by Dr. Max Gasser and Herr Moedebeck, president of the International Commission for "Luftschifferkarten," on maps for use on balloons and flying machines. The arrangement recommended is a general map on a scale of 1/1,000,000, with a smaller 1/200,000-map for the details of routes. The requirements of aërial navigation are dealt with in considerable detail, and a system of conventional signs and colours is proposed. It is suggested that the larger scale map should show parallels at intervals of ten minutes and meridians at intervals of twenty minutes, in accordance with the methods for astronomical determination of position worked out by Dr. Marcuses. Specimen maps accompany the papers.

IN *Symons's Meteorological Magazine* for November Dr. H. R. Mill gives a preliminary account of the remarkable rainfall of October 26–28 in the south of England. On the morning of October 26 the centre of a deep barometric depression lay to the south of Ireland, and moved slowly to the south-eastward; on October 28 a change of direction took place, the centre moving north-easterly, the effect being to enclose the south of England between the S.E. and N.E. paths of the depression. A list of the records is given for places where more than 2·5 inches of rain fell in one day, and more than 4 inches in three consecutive days. Both these conditions obtained in parts of Kent, Sussex, and the Isle of Wight. Among the heaviest falls during the three days, we note 6 inches at Ramsgate and 5·27 inches at Brighton; so far as available records show, no previous daily fall of 3 inches had been observed within twenty miles of Brighton, where 3·60 inches fell on October 26, or within forty miles of Broadstairs, where 3·14 inches fell on October 28. The month over the country as a whole was by no means so wet as October, 1903.

THE *Journal de Physique* for November contains a description of an electromagnetic compass suitable for use on board ironclads, which was described before the Société française de Physique more than a year ago by the inventor, M. Louis Dunoyer, and has now been tested on board one of the French cruisers. The apparatus consists of a solenoid wound with two wires in parallel, which can be rotated at a constant speed about a vertical axis to which its own axis is perpendicular. The ends of each of the two wires are connected to a two-part commutator on the axis of rotation, and the two pairs of brushes bearing on the commutators are set at right angles to each other. From the brushes wires lead to the coils of two moving coil galvanometers. The coils move about horizontal axes at right angles to each other, and mirrors attached to them produce images of two lines of light on a horizontal ground-glass screen. As the solenoid rotates the mean currents through the galvanometer coils are proportional to the sine and cosine of the angle between the axis of the ship and the horizontal component of the earth's magnetic field, and the line joining the crossing point of the two images to the centre of the screen gives the direction and magnitude of that component. The apparatus allows of ready compensation for both permanent and temporary magnetism of the ship. As the ship is "swung" the crossing point of the lines of light describes on the glass screen an ellipse, the axis major of which will, in general, be inclined to the direction of motion of both the galvanometer coils. By rotating the solenoid with respect to the commutators, the axis may be made to coincide with one of these directions. It is then only necessary to add resistance to the circuit of the coil which gives the larger deflection to reduce the ellipse to a circle, which would be the figure obtained if the earth's magnetic field were undisturbed by the vessel. The method is evidently very flexible, and admits of the observations being taken in the cabin while the rotating solenoid is placed on deck.

A PAPER on concrete pile foundations was read by Mr. Alex. Melville on November 23 before the Institution of Engineers and Shipbuilders in Scotland. Special reference was made to the Simplex method, a system which has been specified by the Admiralty for the naval base at Rosyth. This system is the invention of Mr. Frank Shuman, of Philadelphia, who took out his first patents in 1903. The essential principle lies in the driving of a tube or forme constructed of lap-welded steel, the lower end of which is closed by a loose point or by a pair of hinged jaws. These jaws open when the tube is being pulled up and permit concrete to be passed through, filling up the space left by the tube simultaneously with its withdrawal. The jaws are, as it were, cut out of a cylinder of exactly the same section as the sleeve, and so lie close against the sides of the hole left by the sleeve as the forme is withdrawn, thus offering no obstruction to the free passage of the concrete. A driving cap is attached to the top of the forme when the pile-driver is at work. On completion of driving the cap is removed, and concrete is filled into the forme to a height of several feet above the level of the finished head of the pile in order to allow for sinking as the forme is withdrawn, an operation performed by means of tackle connected to the pile-driver. Such piles can be inserted to any depth, and can be put in as close as 3 feet from centre to centre; reinforced piles on this system may also be executed. The method has many advantages, and has been very successfully applied in this and other countries.

Engineering for November 26 has an interesting leading article on the encouragement of aviation. Although there are some small signs of our waking up, everybody must deplore our backwardness in taking a lively and efficient interest in the new movement. It cannot be said, in regard to aviation, that public or national bodies have interfered with onerous legislation such as has retarded other budding industries. The movement has received but little encouragement in the way of State-aided experimental work; plenty of private pioneer work has been done—indeed, we were among the first to take seriously to aëronautics—yet we are woefully behind our neighbours. Extremely rapid progress has been made recently in other countries in heavier-than-air machines, and it seems clear that we should actively encourage the development of that branch of the science which appears of the greatest promise. Two methods have been adopted on the other side of the Atlantic which we might do worse than imitate. One is a national competition promoted by the United States War Department; the other is the method adopted by Dr. Graham Bell, who collected around him a number of ardent workers, who banded themselves together with the object of producing several successful machines. These men were all well acquainted with the principles underlying the art, and their collective wisdom has been well proven in the results achieved. Our own few earnest workers worry along independently, until financial stress often directs their attention to other matters. Continuing, our contemporary thinks that the movement of aviation is not in the right hands. Anyone who attends the meetings of the two best known societies connected with aëronautics must know that the discussions are not at all on a high level, and compare very unfavourably with those at, say, the Institution of Civil Engineers or the Institution of Mechanical Engineers. It is admitted that sport is quite a legitimate opening for aviation, as it has been for yachting and motoring; but, as has happened in these latter sports, the flying machines now built merely to win races will probably give place to machines of a more serviceable type when the movement has become leavened with the ideas of engineers and the results of scientific studies.

Evidence of the interest that is taken in the isomeric change of optically active compounds is afforded by two papers by Mr. H. Wren in the October number of the Chemical Society's Journal. The substance selected for examination was *l*-benzoin, $C_6H_5.CHOH.CO.C_6H_5$, a compound which contains an asymmetric carbon atom, but would lose its optical activity if converted into the isomeric "enol," $C_6H_5.C(OH):C(OH).C_6H_5$, and might therefore be expected to racemise with great readiness, at least in presence of an alkaline catalyst. The experiments carried out by the author showed that *l*-benzoin retained its activity in the crystalline state during three months, and that its solution in acetone was unchanged at the end of eight days. The addition of a small quantity of sodium ethoxide to its alcoholic solution was, however, sufficient to destroy its optical activity in a single day. The methyl ether, $C_6H_5.CH(OCH_3).CO.C_6H_5$, lost its optical activity completely in five minutes when dissolved in alcoholic potash of N/9 strength, and a progressive racemisation by dilute sodium ethoxide was completed in the course of three hours. Complete racemisation took place on attempting to prepare the ethyl ether by means of alcohol and hydrogen chloride, and a partial loss of activity took place when silver oxide and ethyl iodide were used. The oxime $C_6H_5.CH(OH).C(:NOH).C_6H_5$, and carbanilide

$$C_6H_5.CH(O.CO.NH.C_6H_5).CO.C_6H_5,$$

were found to be optically active, but the former suffered a partial loss of activity on acetylation, and the latter was completely racemised by heating above its melting point during four hours at 140°, contact with the glass being shown to be an important factor in promoting the change. A racemic product was also obtained on condensing *l*-benzoin with aniline. The changes here recorded are very similar to those that have been observed amongst the derivatives of camphor, but differ from them in that the inversion of the one asymmetric carbon atom causes a total loss of optical activity

Dr. Maximilian Toch, of New York City, in his address as chairman of the American Society of Chemical Industry, dealt with the influence of chemistry on civilisation. The address is published in the issue of *Science* for November 19. In the course of his remarks, Dr. Toch said:—Chemistry needs no sponsor, but its effect on civilisation has been more marked than that of any other science. True, it has reached out and taken electricity and physics as aids, but, withal, engineering made but little progress until steel and cement—two chemical products—were cheapened, simplified, and made universal. Medicine has claimed great honours, but the masterful work done in coal-tar chemistry, in the production and discovery of synthetic drugs, the discovery of anæsthetics, the marvellous work done in the metabolism of matter, the excellent analytical schemes for the waste matter of the tissues, are all due to the researches of chemistry, and their civilising influence is greatly felt. The engineer may boast of his skill, but he has done nothing greater than the pyramids, nor finer than the temples of Greece and Egypt. The monuments he has wrought in steel were given to him by the ability of the chemist to control carbon in iron, and the economic principle involved in the production of steel supplies work, puts money into circulation, and keeps the wheels turning. For a science so young its civilising influence is enormous, and there is no doubt that the rapid progress which chemistry made in the nineteenth century will be outstripped in the twentieth, for the control of our foodstuffs, the application of the raw materials in the earth, and the refining of metals, create positions, give progress to a country, and help largely in the establishment of chemistry as a profession.

The Geological Society has published a catalogue of the geological literature added to the society's library during the year ended December 31, 1908. The catalogue has been compiled by the assistant-librarian and edited by the assistant-secretary, and its price is 2*s*.

Messrs. Flatters and Garnett, Ltd., 32 Dover Street, Manchester, have just issued a new classified catalogue of lantern-slides illustrating various subjects of biology, geology, astronomy, physiography, textile fibres, machinery, &c. The slides are from drawings, photographs of specimens, and photomicrographs, and most of them are not to be found in other catalogues. For the illustration of lectures or lessons in biological and other subjects many of the slides should prove very valuable.

OUR ASTRONOMICAL COLUMN.

Discovery of a New Comet, 1909*e*.—A telegram from the Kiel Centralstelle announces the discovery of a comet by Prof. Daniel, at Princeton, on December 6. Its position at 9h. 23·9m. (Princeton M.T.) was

R.A. = 6h. 16m. 32s., dec. = 33° 50′ N.,

and its magnitude was estimated as 11·0. This position lies at about the centre of the triangle formed by θ and κ Aurigæ and θ Geminorum. The comet is said to be moving slowly in a northerly direction.

Halley's Comet.—According to the ephemeris, Halley's comet is now approaching the sun at a rate of about 1,230,000 miles per day, whilst its distance from the earth